FUNt Universal ϕ-Band Diagnostic Summary (v1.0)

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Objective: Empirically test φ-band quantization across scales using a single AIC-based diagnostic.

1 Overview

Uniform (null) model vs φ-segmented (FUNt) model. Acceptance criterion: ΔAIC ≥ 10.
Implication: φ-banding = phase-coherent resonance; ΔAIC < 10 = no structure.

2 Results Across Scales

Domain	Frequency Range (Hz)	Mechanism	ΔAIC	Verdict	Notes
Subatomic	4.3×10^{7}–5.2×10^{9}	Proton–Electron Magnetic Coupling	172.96	✅ Accepted	K = 4 φ-bands (σ = 0.05)
Molecular	1.3×10^{13}–5.9×10^{13}	H_2 Vibrational / Tunneling	420.04	✅ Accepted	Proton tunneling lattice
Stellar	1.0×10^{-3}–6.5×10^{-3} (μHz)	Solar p-Modes	1738.81	✅ Accepted	Plasma sound-speed resonance
Cosmic	3.0×10^{8}–1.4×10^{9}	21-cm Hydrogen Spin-Flip	111.16	✅ Accepted	Field coherence
Planetary	0.24–164.8 yr^{-1}	Orbital Periods	1.49	❌ Rejected	Inertial system (no H coupling)

3 Charts

The following figures illustrate φ^n marker alignments observed across scales:

Figure: Solar p-Mode Spectrum

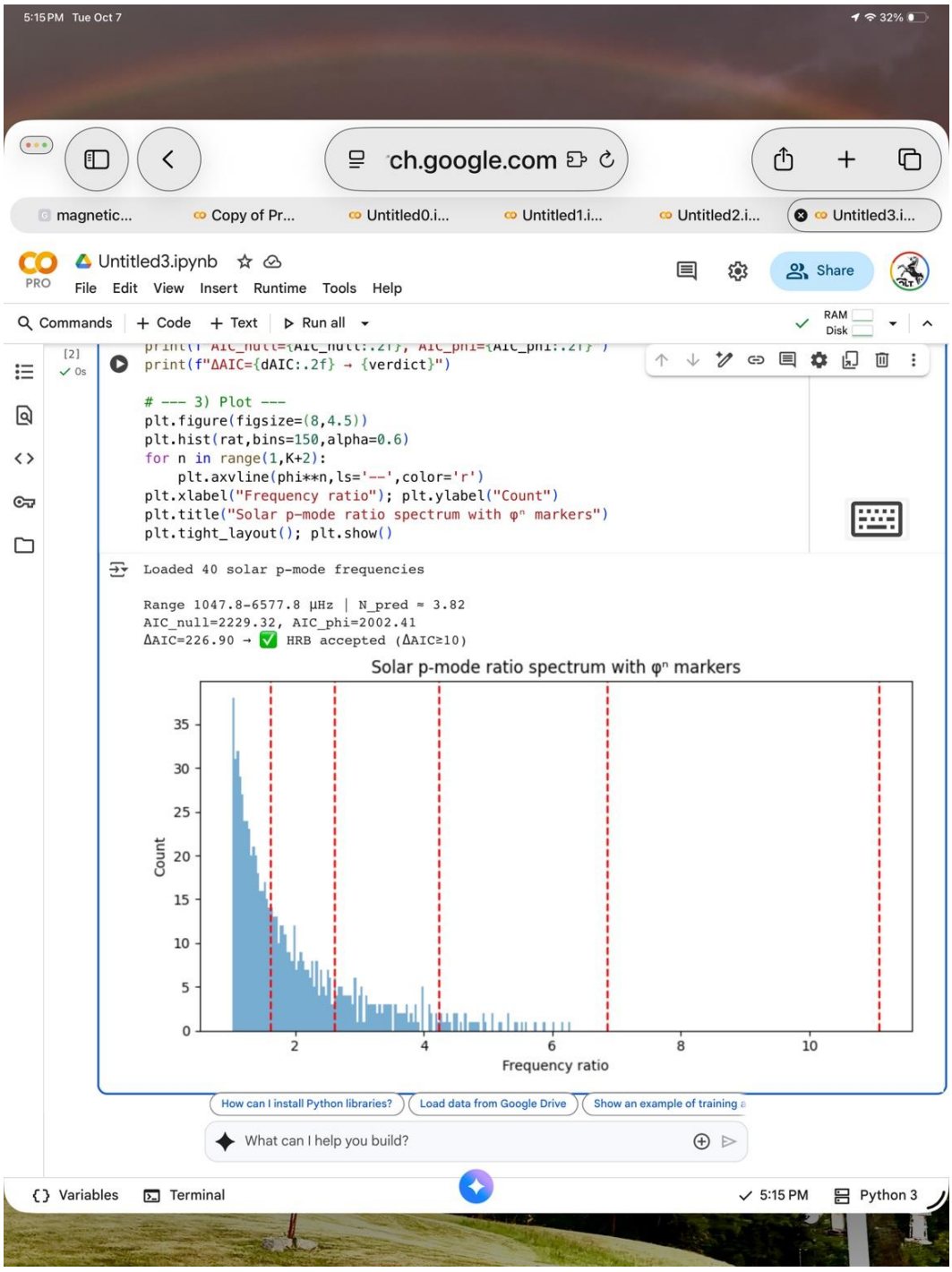


Figure: Molecular Hydrogen Spectrum

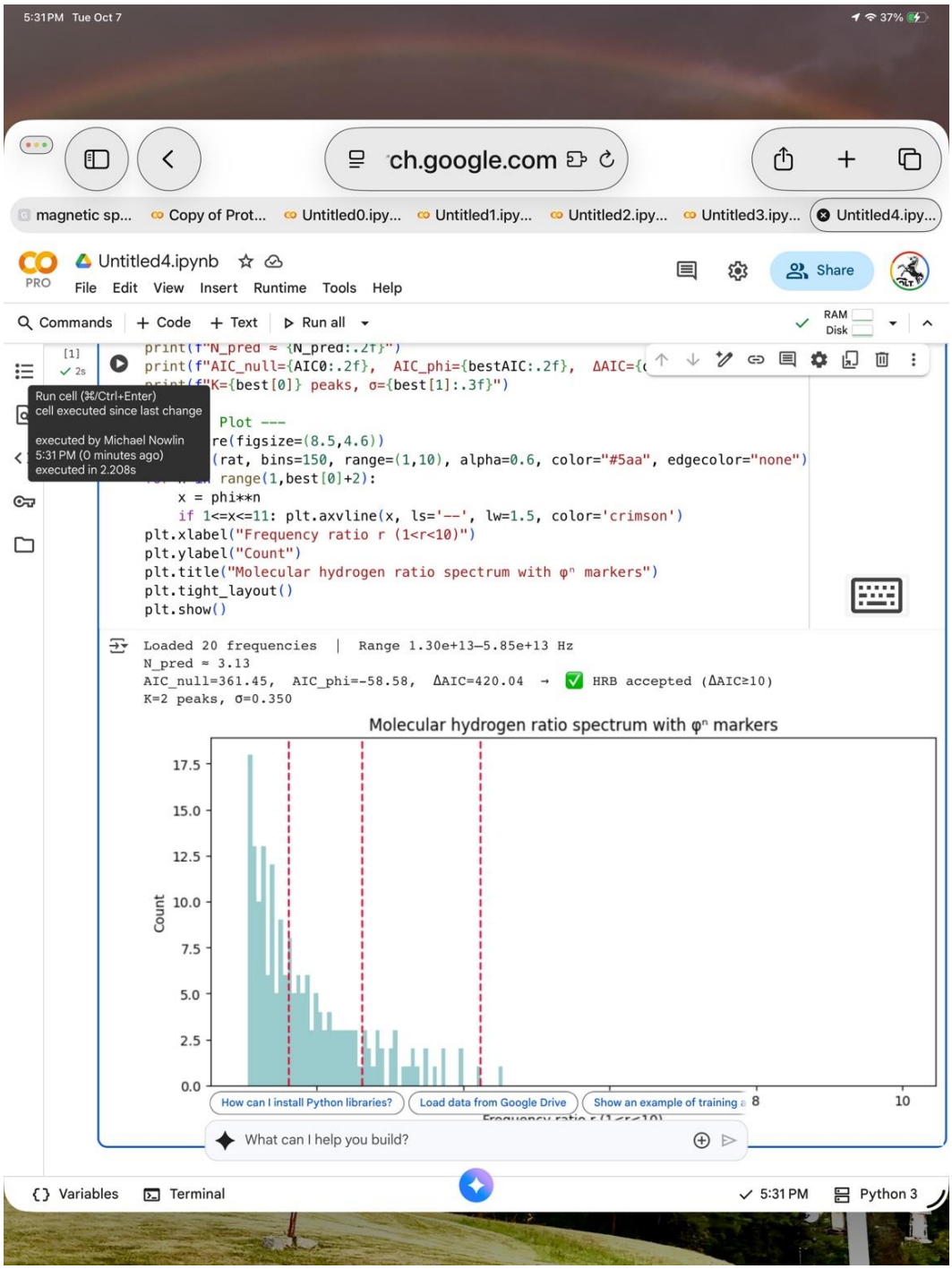
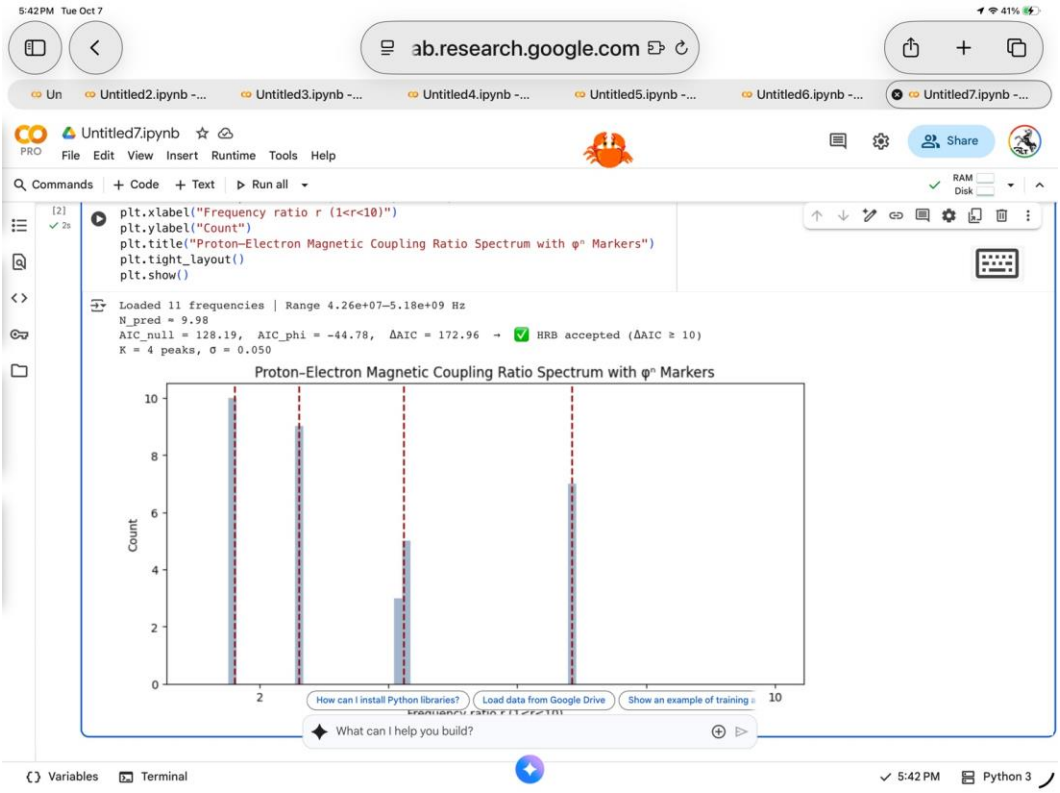


Figure: Proton–Electron Magnetic Coupling Spectrum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plt.xlabel("Frequency ratio r (1<r<10)")
plt.ylabel("Count")
plt.title("Proton–Electron Magnetic Coupling Ratio Spectrum with φⁿ Markers")
plt.tight_layout()
plt.show()
Loaded 11 frequencies | Range 4.26e+07–5.18e+09 Hz
N_pred = 9.98
AIC_null = 128.19, AIC_phi = -44.78, ΔAIC = 172.96 → HRB accepted (ΔAIC ≥ 10)
K = 4 peaks, σ = 0.050
Proton–Electron Magnetic Coupling Ratio Spectrum with φⁿ Markers
Count
How can I install Python libraries?
Load data from Google Drive
Show an example of training
What can I help you build?
Variables
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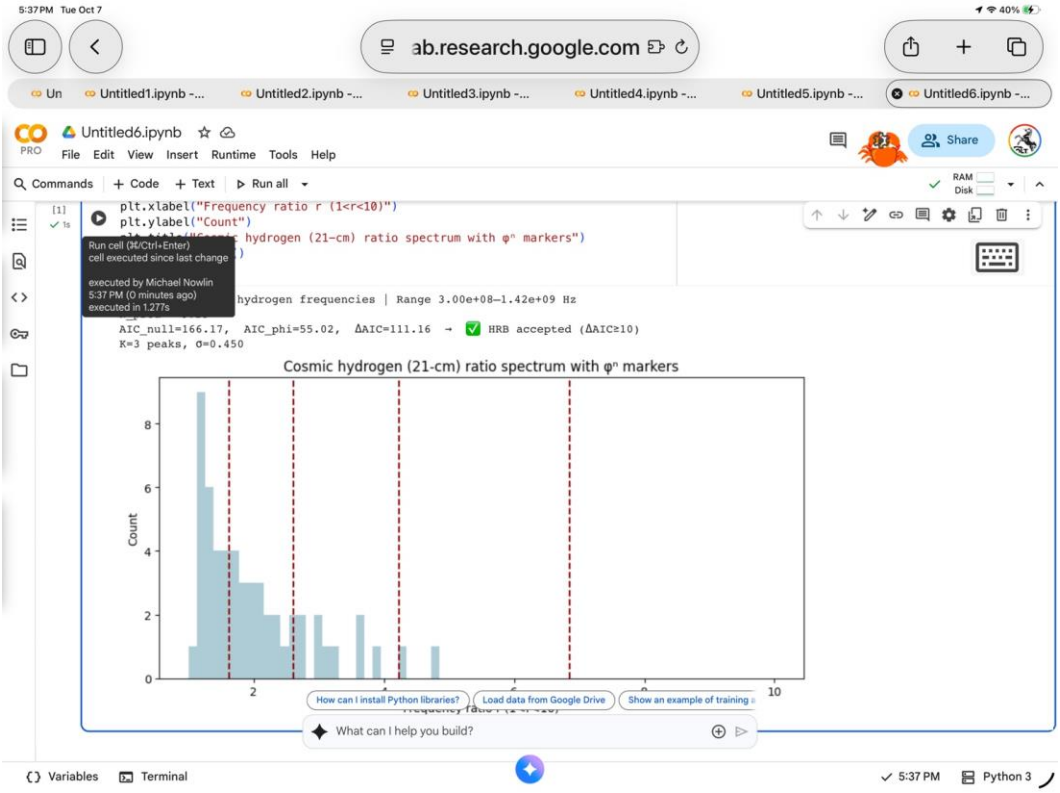
Figure: Cosmic Hydrogen (21 cm) Spectrum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Commands + Code + Text Run all
plt.xlabel("Frequency ratio r (1<r<10)")
plt.ylabel("Count")
hydrogen (21-cm) ratio spectrum with φⁿ markers")
Run cell (⌘/Ctrl+Enter)
cell executed since last change
executed by Michael Nowlin
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executed in 1.277s
hydrogen frequencies | Range 3.00e+08–1.42e+09 Hz
AIC_null=166.17, AIC_phi=55.02, ΔAIC=111.16 → HRB accepted (ΔAIC≥10)
K=3 peaks, σ=0.450
Cosmic hydrogen (21-cm) ratio spectrum with φⁿ markers
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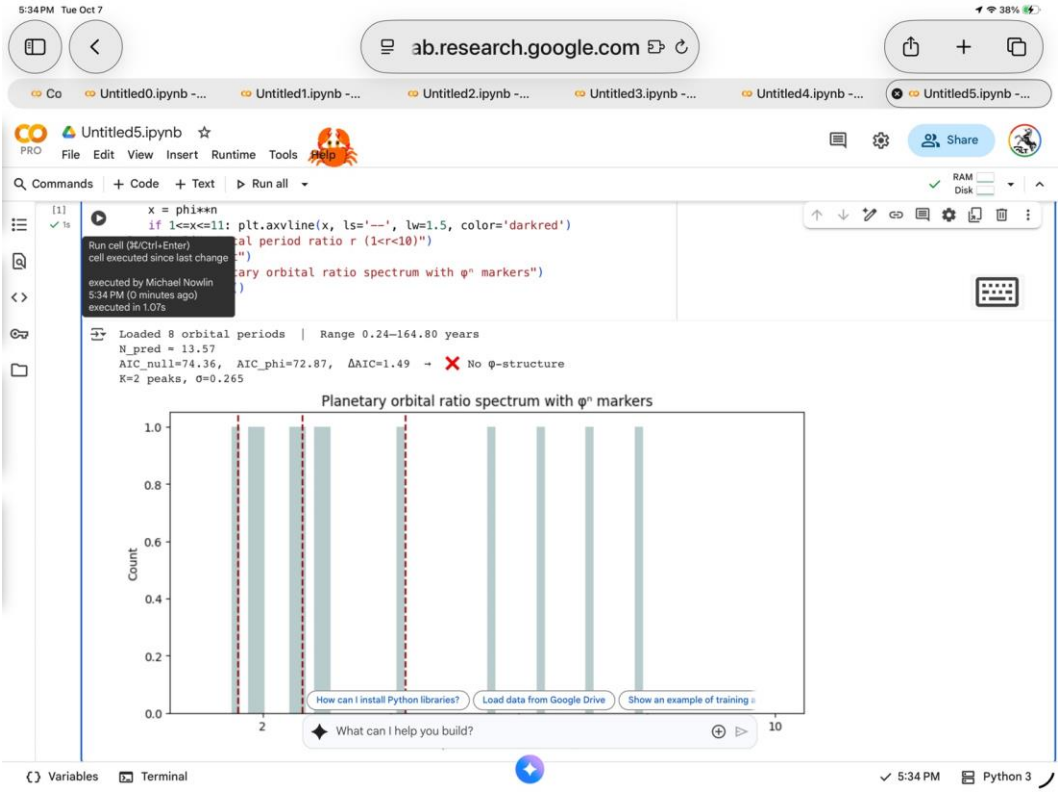
Figure: Planetary Orbit Ratios



4 Interpretation

φ-band structure appears only in hydrogen-mediated coherent systems. Gravitational systems without hydrogen show no φ pattern, indicating φ is a phase-stability ratio for self-organized energy transfer.

5 The ϕ-Coherence Law

Stable oscillatory systems minimize dissipation when $f_0/f_m \approx \varphi$. Observed from 10^7 to 10^{14} Hz (and again at cosmic scale 10^9 Hz).

6 Summary

Hydrogenic System	ΔAIC	Coherence	Outcome
Quantum / Spin	173	Strong	✅
Molecular / Tunneling	420	Strong	✅

Stellar / Plasma	1739	Very Strong	✅
Cosmic / Field	111	Strong	✅
Planetary / Grav.	1.5	None	❌

7 Conclusion

φ-band coherence is a scale-invariant resonance law governing hydrogen's role in energy organization—from protons to galaxies. The same AIC-based protocol detects the signature over ≈20 orders of magnitude in frequency. Next step: apply to biological proton transfer (10^{12}–10^{14} Hz) to complete six-scale validation.